

STDs in Women and Infants

Public Health Impact

Women and infants disproportionately bear the long term consequences of STDs. Women infected with *Neisseria gonorrhoeae* or *Chlamydia trachomatis* can develop pelvic inflammatory disease (PID), which, in turn, may lead to reproductive system morbidity such as ectopic pregnancy and tubal factor infertility. If not adequately treated, 20% to 40% of women infected with chlamydia¹ and 10% to 40% of women infected with gonorrhea² may develop PID. Among women with PID, tubal scarring will cause involuntary infertility in 20%, ectopic pregnancy in 9%, and chronic pelvic pain in 18%.³ Approximately 70% of chlamydial infections and 50% of gonococcal infections in women are asymptomatic.⁴⁻⁶ These infections are detected primarily through screening programs. The vague symptoms associated with chlamydial and gonococcal PID cause 85% of women to delay seeking medical care, thereby increasing the risk of infertility and ectopic pregnancy.⁷ Data from a randomized controlled trial of chlamydia screening in a managed care setting suggest that such screening programs can reduce the incidence of PID by as much as 60%.⁸

Gonorrhea and chlamydia can also result in adverse outcomes of pregnancy, including neonatal ophthalmia and, in the case of chlamydia, neonatal pneumonia. Although topical prophylaxis of infants at delivery is effective for prevention of ophthalmia neonatorum, prevention of neonatal pneumonia requires prenatal detection and treatment.

Human papillomavirus (HPV) infections are highly prevalent, especially among young sexually active women. While the great majority of HPV infections in women resolve within one year, they are a major concern because persistent infection with specific types (e.g., types 16, 18, 31, 33, 35, and 45), are causally related to cervical cancer; these types also cause Pap smear abnormalities. Other types (e.g., types 6 and 11) cause genital warts, low grade Pap smear abnormalities and, rarely, recurrent respiratory papillomatosis in infants born to infected mothers.⁹

Genital infections with herpes simplex virus are extremely common, may cause painful outbreaks, and may have serious consequences for pregnant women including potentially fatal neonatal infections.¹⁰

When a woman has a syphilis infection during pregnancy, she may transmit the infection to the fetus in utero. This may result in fetal death or an infant born with physical and mental developmental disabilities. Most cases of congenital syphilis are easily preventable if women are screened for syphilis and treated early during prenatal care.¹¹

Observations

- Between 2001 and 2002, the reported case rate of chlamydial infections in women increased from 435.2 to 455.4 per 100,000 females (Figure 6, Table 5).

Chlamydia rates exceed gonorrhea rates among women in all states (Figures A and B, Tables 5 and 15).

- In 2002, the median state-specific chlamydia test positivity among 15- to 24-year-old women screened in selected prenatal clinics in 26 states and the Virgin Islands was 7.4% (range 1.5% to 14.4%) (Figure F).
- In 2002, the median state-specific chlamydia test positivity among 15- to 24-year-old women who were screened during visits to selected family planning clinics in all states and outlying areas was 5.6% (range 3.0% to 14.2%) (Figure 8).
- Gonorrhea rates among women were higher than the overall HP 2010 objective of 19.0 cases per 100,000 population¹² in 42 states and two outlying areas in 2002 (Figure B, Table 15). As in previous years, the highest rates of gonorrhea among women in 2002 occurred in the South (Figure B).
- Like chlamydia, gonorrhea is often asymptomatic in women and can only be identified through screening. Large-scale screening programs for gonorrhea in women began in the late 1970s. After an initial increase in cases detected through screening, gonorrhea rates for both women and men declined steadily throughout the 1980s and early 1990s (Figure 14, Tables 15 and 16). The gonorrhea rate for women in 2002 (125.3 per 100,000 females) showed a slight decline since 1998. In 2002, the gonorrhea rate among males declined to 124.2 per 100,000 males, similar to the female gonorrhea rate (Figure 14).
- In 2002, the median state-specific gonorrhea test positivity among 15- to 24-year-old women screened in selected prenatal clinics in 20 states and the Virgin Islands was 0.9% (range 0.0% to 5.7%) (Figure G).
- The HP2010 objective for primary and secondary (P&S) syphilis is 0.2 case per 100,000 population. In 2002, 32 states, the District of Columbia, and two outlying areas had rates of P&S syphilis for women that were greater than 0.2 case per 100,000 population (Figure C, Table 28).
- The HP2010 objective for congenital syphilis is 1.0 case per 100,000 live births. In 2002, 27 states, the District of Columbia, and one outlying area had rates higher than this objective (Figure D, Tables 41 and 42).
- The rate of congenital syphilis closely follows the trend of P&S syphilis among women (Figure E). Peaks in congenital syphilis usually occur one year after peaks in P&S syphilis among women. The congenital syphilis rate peaked in 1991 at 107.3 cases per 100,000 live births, and declined by 90.5% to 10.2 cases per 100,000 live births in 2002 (Figure 32, Table 40). The rate of P&S syphilis among women declined 93.6% (from 17.3 to 1.1 cases per 100,000 females) from 1990 to 2002 (Figure 31).
- While most cases of congenital syphilis occur among infants whose mothers have had some prenatal care (Figure E), late or limited prenatal care has been associated with congenital syphilis. Failure of health care providers to adhere to maternal syphilis screening recommendations also may contribute to the occurrence of congenital syphilis.¹³
- Accurate estimates of pelvic inflammatory disease (PID) and tubal factor infertility resulting from gonococcal and chlamydial infections are difficult to obtain. Definitive diagnosis of these conditions can be complex. Hospitalizations for PID have declined steadily throughout the 1980s and early 1990s, but have remained

relatively constant between 1995 and 2001 (Figure I). These trends may reflect changes in the etiology of PID (with increasing proportions of more indolent chlamydial infection) as well as changes in the clinical diagnosis and management of PID rather than true trends in disease. A greater proportion of women diagnosed with PID in the 1990s have been treated in outpatient instead of inpatient settings when compared to women diagnosed with PID in the 1980s.¹⁴

- The reported number of initial visits to physicians' offices for PID through the National Disease and Therapeutic Index (NDTI) has generally declined from 1993 through 2002 (Figure J). In 2000, an estimated 337,053 cases of PID were diagnosed in emergency departments among women 15- to 44-years of age (National Hospital Ambulatory Medical Care Survey, NCHS).
- Evidence suggests that health care practices associated with ectopic pregnancy changed in the late 1980s and early 1990s. Before that time, treatment of ectopic pregnancy usually required admission to a hospital. Hospitalization statistics were therefore useful for monitoring trends in ectopic pregnancy. Beginning in 1989, hospitalizations for ectopic pregnancy have generally declined over time (Figure H). Data suggest that nearly half of all ectopic pregnancies are treated on an outpatient basis.¹⁵

¹ Stamm WE, Guinan ME, Johnson C. Effect of treatment regimens for *Neisseria gonorrhoeae* on simultaneous infections with *Chlamydia trachomatis*. *N Engl J Med* 1984;310:545-9.

² Platt R, Rice PA, McCormack WM. Risk of acquiring gonorrhea and prevalence of abnormal adnexal findings among women recently exposed to gonorrhea. *JAMA* 1983;250:3205-9.

³ Westrom L, Joesoef R, Reynolds G, et al. Pelvic inflammatory disease and fertility: a cohort study of 1,844 women with laparoscopically verified disease and 657 control women with normal laparoscopy. *Sex Transm Dis* 1992;9:185-92.

⁴ Hook EW III, Handsfield HH. Gonococcal infections in the adult. In: Holmes KK, Mardh PA, Sparling PF, et al, eds. *Sexually Transmitted Diseases*, 2nd edition. New York City: McGraw-Hill, Inc, 1990:149-65.

⁵ Stamm WE, Holmes KK. *Chlamydia trachomatis* infections in the adult. In: Holmes KK, Mardh PA, Sparling PF, et al, eds. *Sexually Transmitted Diseases*, 2nd edition. New York City: McGraw-Hill, Inc, 1990:181-93.

⁶ Zimmerman HL, Potterat JJ, Dukes RL, et al. Epidemiologic differences between chlamydia and gonorrhea. *Am J Public Health* 1990;80:1338-42.

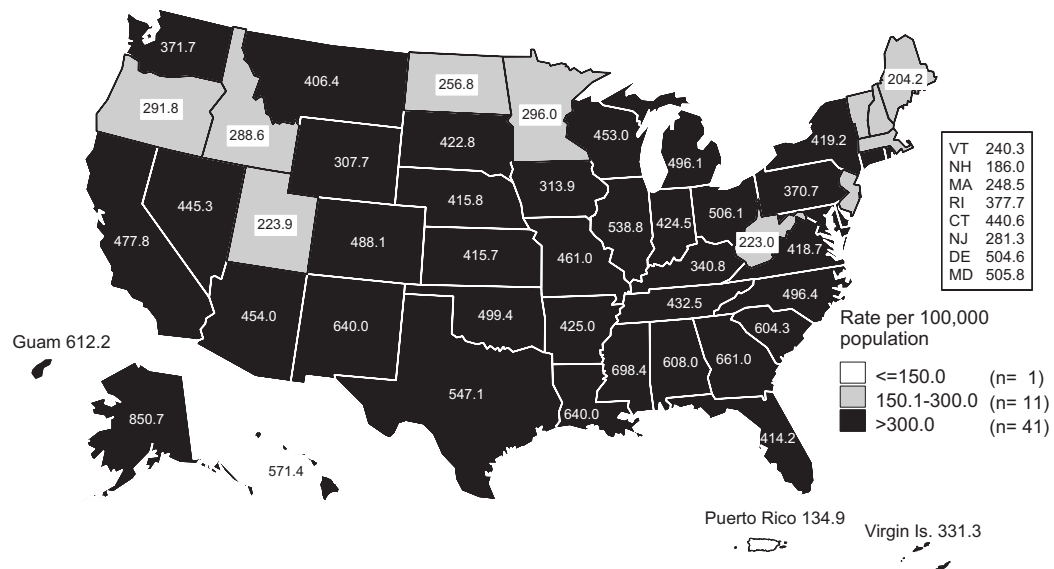
⁷ Hillis SD, Joesoef R, Marchbanks PA, et al. Delayed care of pelvic inflammatory disease as a risk factor for impaired fertility. *Am J Obstet Gynecol* 1993;168:1503-9.

⁸ Scholes D, Stergachis A, Heidrich FE, Andrilla H, Holmes KK, Stamm WE. Prevention of pelvic inflammatory disease by screening for cervical chlamydial infection. *N Engl J Med* 1996;34(21):1362-6.

⁹ Division of STD Prevention. *Prevention of Genital HPV Infection and Sequelae: Report of an External Consultants' Meeting*. National Center for HIV, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, December 1999.

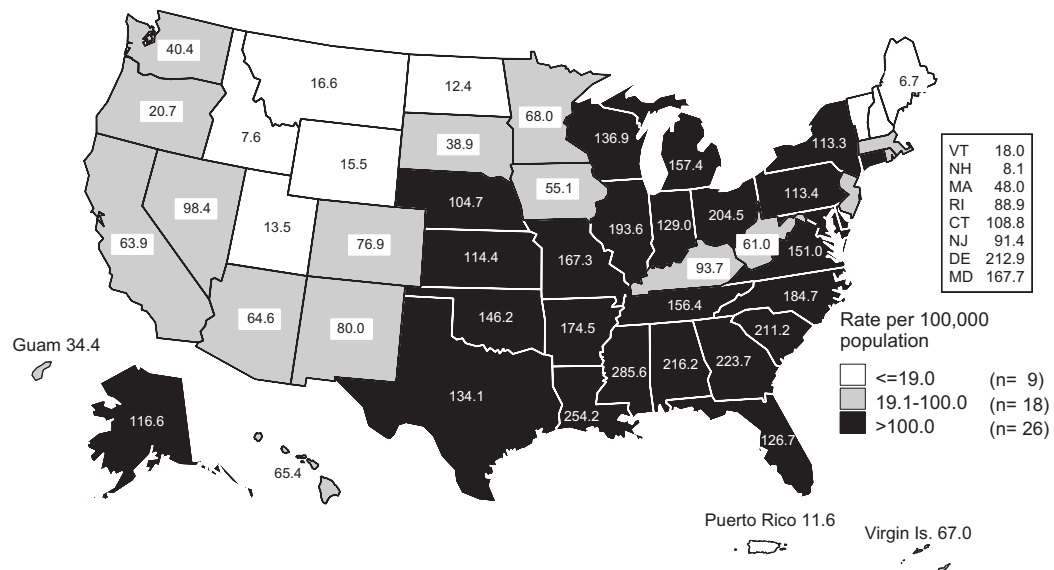
- ¹⁰Handsfield HH, Stone KM, Wasserheit JN. Prevention agenda for genital herpes. *Sex Transm Dis* 1999;26:228-231.
- ¹¹Centers for Disease Control. Guidelines for prevention and control of congenital syphilis. *MMWR* 1988;37(No.S-1).
- ¹²U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office, November 2000.
- ¹³Centers for Disease Control and Prevention. Congenital syphilis—United States, 2000. *MMWR* 2001;50:573-77.
- ¹⁴Rolfs RT, Galaid EI, Zaidi AA. Pelvic inflammatory disease: trends in hospitalization and office visits, 1979 through 1988. *Am J Obstet Gynecol* 1992;166:983-90.
- ¹⁵Centers for Disease Control and Prevention. Ectopic pregnancy in the United States, 1990-1992. *MMWR* 1995;44:46-8.

Figure A. Chlamydia — Rates for women by state: United States and outlying areas, 2002



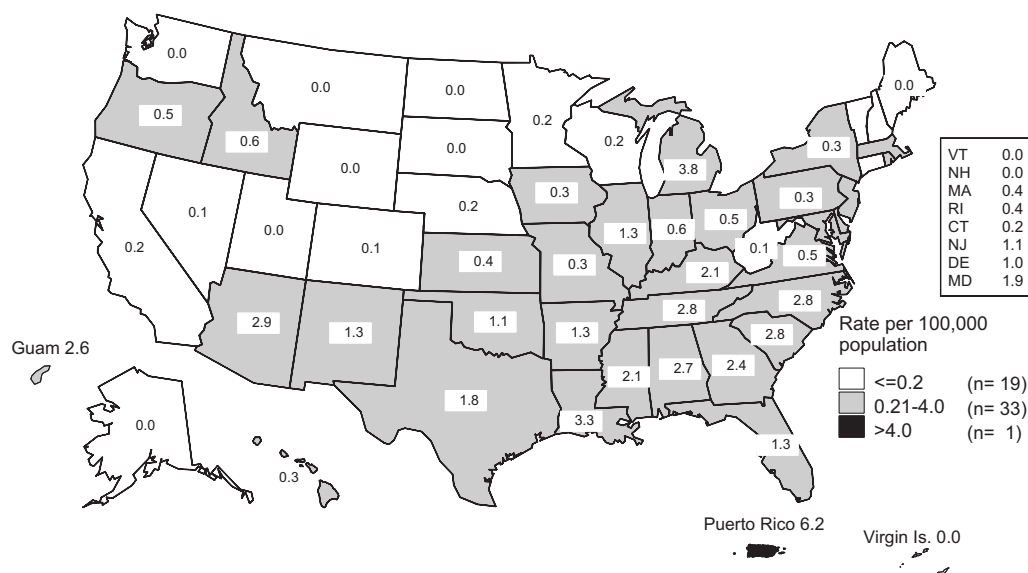
Note: The total rate of chlamydia for women in the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 451.1 per 100,000 female population.

Figure B. Gonorrhea — Rates for women by state: United States and outlying areas, 2002



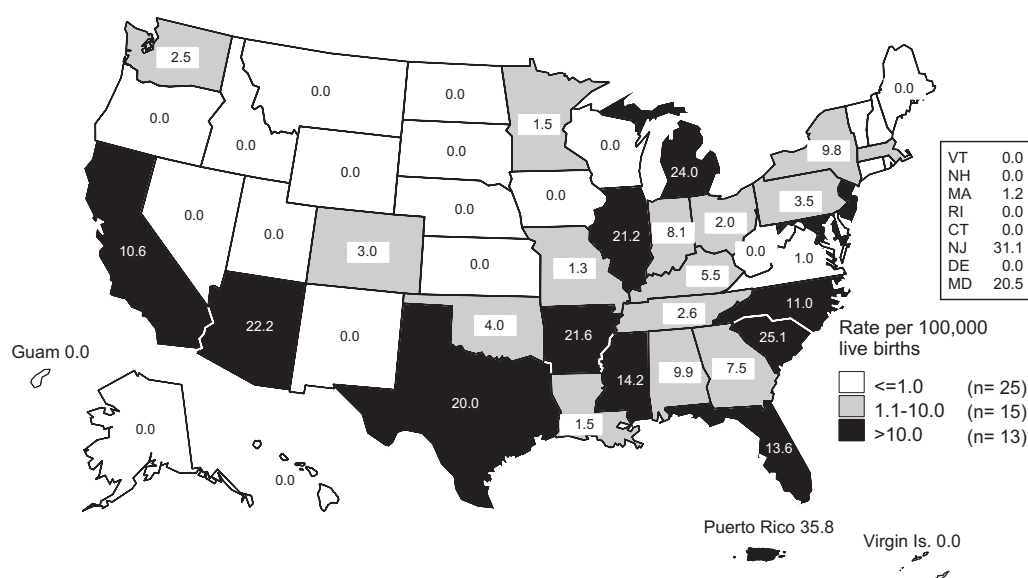
Note: The total rate of gonorrhea for women in the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 123.7 per 100,000 female population.

Figure C. Primary and secondary syphilis — Rates for women by state: United States and outlying areas, 2002



Note: The total rate of primary and secondary syphilis for women in the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 1.2 per 100,000 female population.

Figure D. Congenital syphilis — Rates for infants <1 year of age by state: United States and outlying areas, 2002



Note: The total rate of congenital syphilis for infants <1 year of age for the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 10.6 per 100,000 live births. The Healthy People 2010 objective is 1.0 case per 100,000 live births.

Figure E. Congenital syphilis — Cases by prenatal care utilization: United States, 1995-2002

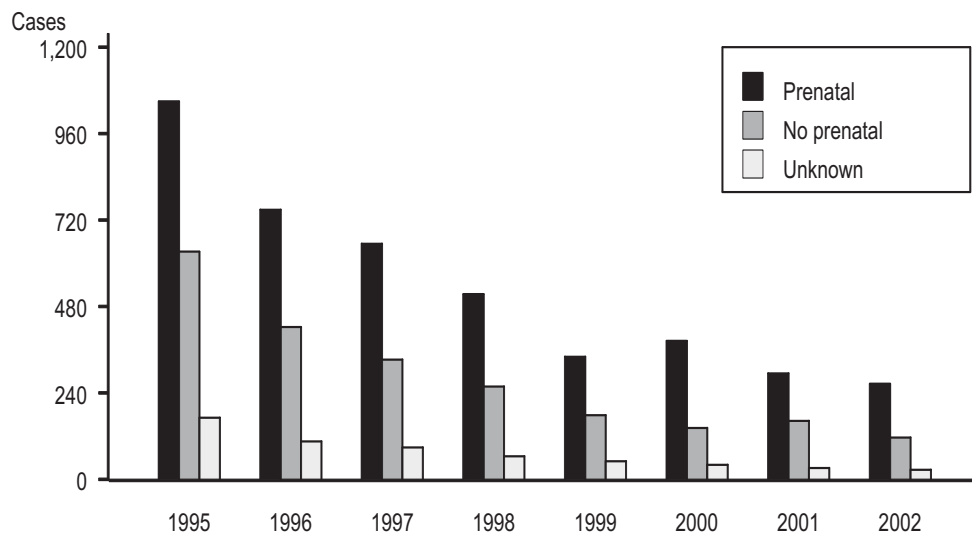
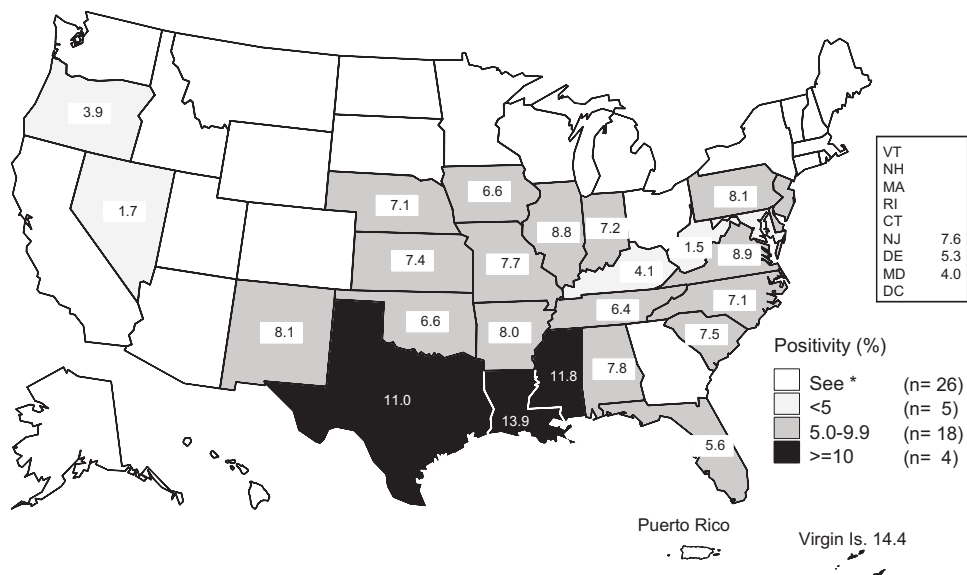


Figure F. Chlamydia — Positivity among 15-24 year old women tested in prenatal clinics by state: United States and outlying areas, 2002



*States not reporting chlamydia positivity data in prenatal clinics.

Note: States reported chlamydia positivity data on at least 100 women aged 15-24 years during 2002.

SOURCE: Regional Infertility Prevention Projects; Office of Population Affairs; Local and State STD Control Programs; Centers for Disease Control and Prevention

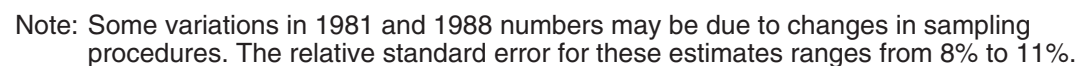
Positivity (%)

Positivity Range (%)	Number of Samples (n)
See *	(n= 32)
<1	(n= 11)
1.0-1.9	(n= 5)
>=2	(n= 5)

State/Territory	Positivity (%)
VT	1.5
NH	1.5
MA	1.5
RI	1.5
CT	1.5
NJ	1.5
DE	1.5
MD	1.5
DC	1.5
Alaska	0.0
California	0.0
Idaho	0.0
Montana	0.0
Wyoming	0.0
Utah	0.0
Arizona	0.0
Nevada	0.0
Colorado	0.0
Nebraska	0.0
Kansas	0.0
Oklahoma	0.0
Missouri	0.0
Illinois	0.0
Indiana	0.0
Ohio	0.0
Michigan	0.0
Wisconsin	0.0
Minnesota	0.0
Iowa	0.0
South Dakota	0.0
North Dakota	0.0
South Carolina	0.0
Georgia	0.0
Florida	0.0
Alabama	0.0
Mississippi	0.0
Louisiana	0.0
Texas	0.0
New Mexico	0.0
Puerto Rico	0.0
Virgin Is.	0.0

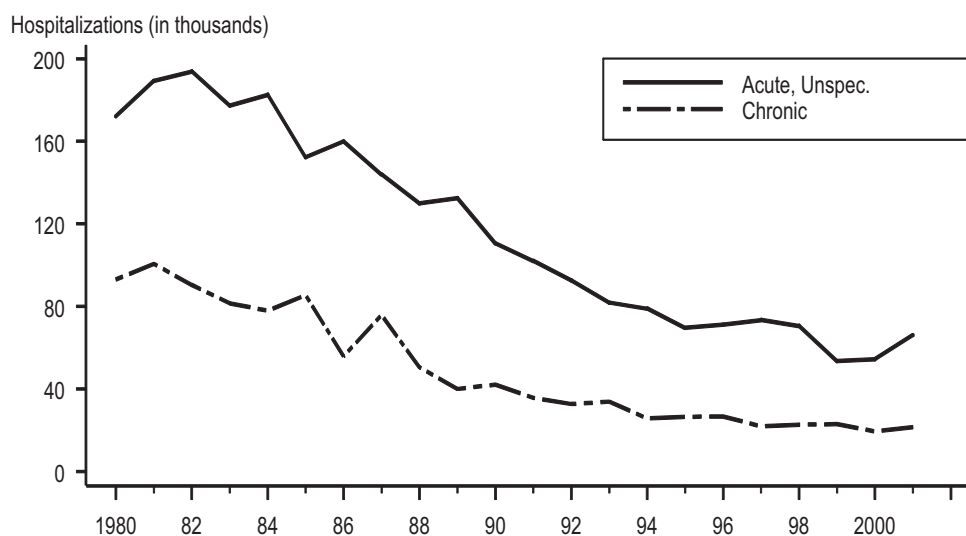
Note: States reported gonorrhea positivity data on at least 100 women aged 15-24 years during 2002.

Figure H. Ectopic pregnancy — Hospitalizations of women 15-44 years of age: United States, 1980-2001



STD Surveillance 2002

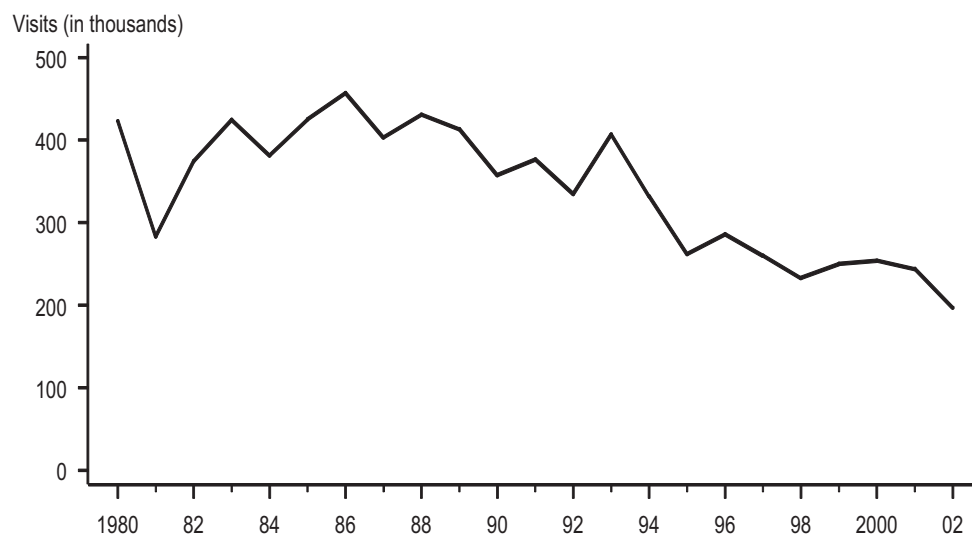
Figure I. Pelvic inflammatory disease — Hospitalizations of women 15-44 years of age: United States, 1980–2001



Note: The relative standard error for the estimates of the overall total number of PID cases range from 6% to 15%.

SOURCE: National Hospital Discharge Survey (National Center for Health Statistics, CDC)

Figure J. Pelvic inflammatory disease — Initial visits to physicians' offices by women 15-44 years of age: United States, 1980–2002



Note: See Appendix (Other Data Sources).

SOURCE: National Disease and Therapeutic Index (IMS America, Ltd.)

